Space Weather Forecast

Issued on Saturday, 30 September 2023 at 01:16 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Chance of Moderate-flares throughout. Chance of G1 Minor Storm conditions on day 3 (02 Oct).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low activity with mainly low level Common-class flares observed. A single mid-high Common flare was associated with a new region currently at the northeast limb. There are ten sunspot regions on the disc, the most notable is in the southeast which has seen some small growth and has a moderately complex magnetic structure, although it remains a relatively small and inactive region. A further region approaching centre disc in the northern hemisphere has also shown some slow growth and increase in magnetic complexity, however, this region remains somewhat simpler. All other regions are magnetically simple at this time. No Earth-directed CMEs (coronal mass ejections) have been observed in the past 24hrs.

Solar Wind / Geomagnetic Activity: The near-Earth environment was indicative of residual weak CME effects from late 28 Sep, perhaps including some minor coronal hole fast wind influence. Solar winds were largely at slightly elevated levels, varying between 420-500km/s, but with a peak of 525km/s at 29/0945 UTC. The interplanetary magnetic field was mainly at weak levels, with occasional moderate levels reached, mainly during the first half of the UTC day. The important north-south component was predominately negative (southward) and Moderate early in the period. Weak, mainly positive values have been observed since around 29/1000 UTC. Resultant geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels, with no Solar Radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is expected to remain at Low to Moderate levels, with a chance of isolated Moderate-class flares.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs. Current slightly elevated solar winds may involve some combination of residual CME effects from 28 Sep and also connection to the fast wind from a northern hemisphere coronal hole. Winds may vary, somewhat erratically between slightly elevated and background levels in the coming days, until the fast wind enhancement from a coronal hole takes place. This is anticipated to occur on day 3 (02 Oct). Speeds are then expected to increase to slightly elevated to elevated levels by the end of day 4 (03 Oct).

Mainly Quiet to Unsettled geomagnetic activity is expected until the main enhancement occurs, most likely day 3 (02 Oct). Activity is then expected to increase to be Unsettled to Active with a chance of G1 Minor Storms, before reducing back to mainly Quiet to Unsettled levels on day 4 (03 Oct).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background levels, but with a very slight chance of minor Solar Radiation storms.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	5	30	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	35	35	35	35
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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